All topics and dates are tentative and subject to change. Any substantive changes (such as due dates) will be announced on Piazza.

Week	Date	High-level topic	Specific topics	Quizzes	Project checkpoints	Assignments
1	Mon, Aug 22	1. Introduction to artificial intelligence	a. Overview of AI	Prereq Quiz (ungraded)		
1	Wed, Aug 24		b. Research in AI	Prereq Quiz (ungraded)		
1	Fri, Aug 26		c. Selecting research papers, PCA motivation, intution	Prereq Quiz (ungraded)		
2	Mon, Aug 29	2. Principal components analysis (PCA)	a. Brief review of linear algebra			
2	Wed, Aug 31		b. NumPy and Matplotlib libraries	Quiz 1		
2	Fri, Sep 02		c. PCA formulation and different algorithms		*Suggested but optional: Select 3 papers*	Assignment 1
3	Mon, Sep 05		*Labor day*			
3	Wed, Sep 07	3. Machine learning basics	a. Introduction to machine learning (ML)	Quiz 2		
3	Fri, Sep 09		b. K nearest neighbors (KNN) and model evaluation			Assignment 2
4	Mon, Sep 12		c. Linear and logistic regression			
4	Wed, Sep 14		d. Gradient descent	Quiz 3		
4	Fri, Sep 16		e. Loss functions and regularization		**Draft of review of 3 papers**	
5	Mon, Sep 19	4. Basics of deep learning	a. Fully connected NN and activation functions			
5	Wed, Sep 21		b. PyTorch deep learning framework	Review Quiz 4		
5	Fri, Sep 23		c. Convolutional networks		*Peer reviews due*	Assignment 3
6	Mon, Sep 26		d. Other common layers: residual, batch norm.			
6	Wed, Sep 28		e. (continued)	Quiz 5		
6	Fri, Sep 30	5. Clustering	a. Clustering loss function, K-means clustering			Assignment 4
7	Mon, Oct 03		c. Spectral clustering (another use of SVD)			
7	Wed, Oct 05	6. Review of probability	a. Review of probability and random variables	Quiz 6		
7	Fri, Oct 07		a. Review of probability and random variables			Assignment 5
8	Mon, Oct 10		*October break*			
8	Wed, Oct 12	6. Density estimation	a. KL divergence and maximum likelihood (MLE)	Quiz 7		
8	Fri, Oct 14		b. Gaussian and non-parametric density estimators		**Initial implementation and writeup**	
9	Mon, Oct 17		c. Gaussian Mixture Models and EM			
9	Wed, Oct 19	7. Non-linear dimensionality reduction	a. Autoencoder, Denoising / Sparse / Probabilistic	Review Quiz 8		
9	Fri, Oct 21		b. Variational Autoencoder (VAE)		*Peer reviews due*	Assignment 6
10	Mon, Oct 24	8. Generative Adversarial Networks (GAN)	a. Original GAN and theory			
10	Wed, Oct 26		a. (continued)	Quiz 9		
10	Fri, Oct 28		b. Deep Convolutional GAN (DCGAN)			Assignment 7
11	Mon, Oct 31		b. (continued)			
11	Wed, Nov 02		c. Other GAN-based models	Quiz 10		
11	Fri, Nov 04		c. (continued)			
12	Mon, Nov 07	9. Normalizing Flows	a. Flow concept and invertible models			
12	Wed, Nov 09		b. Image flows - RealNVP / GLOW	Quiz 11		
12	Fri, Nov 11		c. Continuous normalizing flows / iterative flows			
13	Mon, Nov 14		c. (continued)			
13	Wed, Nov 16	10. Special topics (time allowing)	a. TBD	Quiz 12		
13	Fri, Nov 18		b. TBD		**Term paper due**	
14	Mon, Nov 21		c. TBD		**Implementation and video due**	
14	Wed, Nov 23		*Thanksgiving break*			
14	Fri, Nov 25		*Thanksgiving break*			
15	Mon, Nov 28		Presentations			
15	Wed, Nov 30		Presentations	Review Quiz 13		
15	Fri, Dec 02		Presentations			Assignment 8
16	Mon, Dec 05		Presentations			
16	Wed, Dec 07		Presentations			
16	Fri, Dec 09		Presentations		***Final peer reviews due***	Assignment 9
17	Mon, Dec 12		No final exam			
17	Wed, Dec 14		No final exam			
17	Fri, Dec 16		No final exam			